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EXAMINER

LO, KENNETH M

ART UNIT PAPER NUMBER

2188

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/28/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Office Action Summary

Application No.

10/525,921

Applicant(s)

ROSKER ET AL.

Examiner

Kenneth M. Lo

Art Unit

2188

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 February 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 25 February 2005 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date 02/25/2005
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

DETAILED ACTION

The instant application having Application No. 10/525921 has a total of 16 claims pending in the application; all of which are ready for examination by the examiner.

Oath/Declaration

1. The applicant's oath/declaration has been reviewed by the examiner and is found to conform to the requirements prescribed in **37 C.F.R. 1.63**.

Drawings

2. The drawings are objected to as failing to comply with 37 CFR 1.84(p)(5) because they do not include the following reference sign(s) mentioned in the description:

No reference numbers mentioned under the Detailed Description section of the disclosure are indicated in the drawing. Ex. "a storage system 10" or "a storage mechanism 12" on Page 2, Line 20 and 22 respectively, are not indicated on the drawing submitted.

Drawing should include a label "Figure 1" to correspond to the Figure 1 designation as indicated on Page 2 under the Brief Summary of the Drawing section of the specification.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate

prior version of the sheet, even if only one figure is being amended. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Information Disclosure Statement

3. As required by **M.P.E.P 609(C)**, the applicant's submissions of the Information Disclosure Statement dated 02/28/2005 are acknowledged by the examiner and the cited reference have been considered in the examination of the claims now pending. As required by **M.P.E.P 609 C(2)**, a copy of the PTOL-1449 initialed and dated by the examiner is attached to the instant office action.

Specification

4. The abstract of the disclosure is objected to because Examiner requests "a read director determine" (Line 4) be changed to "a read director determines". Correction is required. See MPEP § 608.01(b).

5. The specification should be modified to include drawing number indication as "Figure 1" on Line 1 of the Detailed Description on Page 2 to correspond to the designation of the drawing as Figure 1 under Brief Summary of the Drawing. Appropriate correction is required.

Claim Objections

6. Claim 14 is objected to because of the following informalities: Claim appears to be missing appropriate claim invention language a because of typographical error or inadvertent exclusion of words/characters. Applicant claims "writing content from the storage mechanism to." which is believed to be intended to be written, as per specifications (Page 4, Line 15), as "writing content from the storage mechanism to the local cache storage unit." In the interest of expediting the examination process, Examiner will assume above correction is the intended claimed invention and with interpret claim as such throughout this Action.

Appropriate correction is required.

REJECTIONS NOT BASED ON PRIOR ART

Claim Rejections - 35 USC § 112

7. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

8. **Claims 10 & 16** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention.

As per Claims 10 & 16, Applicant claims invention reduces reading and writing from the storage mechanism during intervals of limited bandwidth. However, Applicant's disclosure fails to describe how the invention determines these "intervals of limited bandwidth" to reduce reading and writing. Clarification is requested.

REJECTIONS BASED ON PRIOR ART

Claim Rejections - 35 USC § 102

9. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

10. Claims **1-2, 4-12, 15-16** are rejected under 35 U.S.C. 102(e) as being anticipated by Chiou et al. (United States Patent 6,792,507).

As per Claim 1, Chiou et al. discloses, "a storage mechanism for storing content" as [**"storing data on computers" (Col 1, Line 7)**] "at least one local cache storage unit for mirroring at least a portion of the content stored on the storage mechanism" [**Chiou et al. discloses this limitation as "Caching is a technique of mapping frequently used data from a slow storage device, in which it is typically stored, to a higher speed storage device to achieve data access performance**

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gains since the data can be more rapidly accessed from the higher speed storage device.” (Col 1, Line 18)] “a write director coupled to the storage mechanism and to the at least one local storage cache for controlling content written into the storage mechanism and to the at least one local storage cache” [Chiou et al. discloses this limitation as “A cache manager software program may be executed by a processor on this card and the manager may monitor the data traffic through the system and manage the local cache.” (Col 3, Line 53)] “a cache manager for managing content copying between the storage mechanism and the at least one local storage cache to maintain at least partial content coherency” [Chiou et al. discloses this limitation as “To maintain the cache coherency, a user configurable cache scheme will be used to customize the implementation of the system which implements sophisticated cache algorithms.” (Col 6, Line 33) and “However, when a write request occurs, the system on the storage side will use the written data to refresh its cache and the cache system on the host side will either use the data to refresh its cache or to simply invalidate the same data in the cache if it was already there. Moreover, the system on the host side will work with all other cache systems on the network that are on the same access zone to do the same update or invalidation operations for their caches.” (Col 3, Line 24)] “a read director responsive to a request for content from a user for directing said content request to a selected one of the at least one local storage cache and the storage mechanism depending on content availability of each” [Chiou et al. discloses this limitation as “Each read request initiated by a host would first be checked against

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the cached data in host-side cache system and be satisfied by that system if the requested data is present. If the host-side cache could not satisfy the read request, the read request is sent out to the storage-side cache. If a cache hit occurs at the storage-side cache system, the read request is satisfied by that system. If both cache systems fail to generate a cache hit for the read request then the request is forwarded to the target storage device to satisfy the read request.” (Col 3, Line 3)] “a storage mechanism access manager for monitoring read and write loading of the storage mechanism and for controlling the read and write directors and the cache manager in accordance with the storage mechanism read and write loading.” [Chiou et al. discloses this limitation as “a cache unit for caching data between a computer host and a storage device is provided. The cache unit comprises a computer host cache for caching data requested by the computer host, a storage device cache for caching data stored on the storage device, and a cache controller for servicing the read and write requests from the computer host for data located on the storage device.” (Col 5, Line 11)].

As per Claim 2, Chiou et al discloses, “wherein the cache manager manages the storage capacity of the local cache storage unit by successively deleting a least accessed file until the local cache storage unit has an available storage capacity above a prescribed level” as [“In step 98, the cache manager may check for available space in the SSC cache to see if, to store the current requested data, the cache manager needs to purge old cache data using either a typical least recently used

cache data replacement algorithm or alternatively using pre-set time limits depending on their data types.” (Col 13, Line 29)].

As per Claim 4, Chiou et al discloses, “wherein the storage mechanism further comprises at least one disk drive” as **[“each computer system 24 may include one or more computer/storage systems 26, such as servers or disk-based RAID controllers” (Col 7, Line 32)].**

As per Claim 5 & 7, Chiou et al. discloses, “wherein the storage mechanism further comprises at least one Redundant Array of Inexpensive Disk Drives (RAID)” as **[“each computer system 24 may include one or more computer/storage systems 26, such as servers or disk-based RAID controllers” (Col 7, Line 32)].**

As per Claim 6, Chiou et al. discloses, “wherein the local cache storage unit further comprises at least one disk drive” as **[“The cache memory, in accordance with the invention, may be either solid-state memory or magnetic-mechanical type disk drives.” (Col 6, Line 38)].**

As per Claim 8, Chiou et al. discloses, “wherein the read director redirects a request for content to the local cache storage unit when the requested content is available thereat to reduce bandwidth requirements on the storage mechanism” as **[“The cache system will shorten the access time versus the available network bandwidth, if the accessed data is hit in the cache.” (Col 6, Line 32)].**

As per Claim 9, Chiou et al. discloses, “wherein the cache manager copies at least some content from the storage mechanism to the local cache storage unit previously unavailable on the local cache storage unit” as **[“If a cache hit does not**

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occur (e.g., the requested data is not located in the SSC cache), then the line card reads the requested data from the target disk and sends the data back to the requestor in step 94. In step 96, the line card may forward the requested data along with the original request to the cache manager responsible for the target device. In step 98, the cache manager may check for available space in the SSC cache to see if, to store the current requested data" (Col 13, Line 18)].

As per Claim 10, Chiou et al. discloses, "wherein the storage mechanism access manager controls the read and write directors to reduce reading from, and writing to the storage mechanism during intervals of limited storage mechanism bandwidth" as ["The type of caching may be either file-based caching or block-based caching. A file caching implementation, in accordance with the invention, allows the cached data to exist in the host-side system or storage-side system, but the data may also be located anywhere inside the storage network infrastructure. Therefore, as long as the system maintains a fast locator for the cached file data, the physical location of the file data is irrelevant. The block caching implementation allows the cached data to be stored in the host-side system or the storage-side system and eliminates the need to access the data across bandwidth limited LAN, SAN or WAN networks." (Col 6, Line 40)].

As per Claim 11, Chiou et al. discloses, "writing incoming content to at least one of a Storage Area Network (storage mechanism) and a local cache storage unit" as [See figures 7-9. "In step 196, after the cache has been updated or invalidated, the line card sends a write request and the data to the target device." (Col 15, Line

20)] "monitoring content coherency between the storage mechanism and the local cache storage unit" [Chiou et al. discloses this limitation as "To maintain the cache coherency, a user configurable cache scheme will be used to customize the implementation of the system which implements sophisticated cache algorithms." (Col 6, Line 33)] "copying content between the storage mechanism and the local cache storage unit in accordance with the content coherency there between" [Chiou et al. discloses this limitation as "However, when a write request occurs, the system on the storage side will use the written data to refresh its cache and the cache system on the host side will either use the data to refresh its cache or to simply invalidate the same data in the cache if it was already there. Moreover, the system on the host side will work with all other cache systems on the network that are on the same access zone to do the same update or invalidation operations for their caches." (Col 3, Line 24)] "directing a request for content from a user to a selected one of the storage mechanism and the local cache storage unit depending on the content availability of each" [Chiou et al. discloses this limitation as "Each read request initiated by a host would first be checked against the cached data in host-side cache system and be satisfied by that system if the requested data is present. If the host-side cache could not satisfy the read request, the read request is sent out to the storage-side cache. If a cache hit occurs at the storage-side cache system, the read request is satisfied by that system. If both cache systems fail to generate a cache hit for the read request then the request is forwarded to the target storage device to satisfy the read

request.” (Col 3, Line 3)] “monitoring read and write loading of the storage mechanism; and controlling reading of content from, and writing of content to the storage mechanism in accordance with the storage mechanism read and write loading.” [Chiou et al. discloses this limitation as “a cache unit for caching data between a computer host and a storage device is provided. The cache unit comprises a computer host cache for caching data requested by the computer host, a storage device cache for caching data stored on the storage device, and a cache controller for servicing the read and write requests from the computer host for data located on the storage device.” (Col 5, Line 11)].

As per Claim 12, Chiou et al. discloses, “wherein the step of directing the content request further comprises re-directing the content request to the local cache storage unit if the requested content resides at the local cache storage unit” [“The cache system will shorten the access time versus the available network bandwidth, if the accessed data is hit in the cache.” (Col 6, Line 32)].

As per Claim 15, Chiou et al. discloses, “comprising the step of writing content from the local cache storage unit to the storage mechanism” as [“In the “critical coherent” mode, the cache gets updated or invalidated before the data gets actually written to the target device.” (Col 15, Line 3)].

As per Claim 16, Chiou et al. discloses, “wherein the step of controlling reading of content from, and writing of content to the storage mechanism further comprises the step of restricting access to the storage mechanism during intervals of high bandwidth demand” as [“The type of caching may be either file-based caching or block-based

caching. A file caching implementation, in accordance with the invention, allows the cached data to exist in the host-side system or storage-side system, but the data may also be located anywhere inside the storage network infrastructure. Therefore, as long as the system maintains a fast locator for the cached file data, the physical location of the file data is irrelevant. The block caching implementation allows the cached data to be stored in the host-side system or the storage-side system and eliminates the need to access the data across bandwidth limited LAN, SAN or WAN networks.” (Col 6, Line 40)].

Claim Rejections - 35 USC § 103

11. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

12. **Claims 3, 13-14** are rejected under 35 U.S.C. 103(a) as being unpatentable over Chiou et al. (United States Patent 6,792,507) in view of Tremblay et al. (United States Patent Application Publication US 2002/0184460 A1).

As per Claim 3 & 13, Chiou et al. discloses, “The storage system of claim 1” as **[See rejection to Claim 1 above]** but fails to explicitly disclose “further comprises a filler storage unit for storing filler content, and wherein the read director directs the read request to the filler storage unit to provide filler content when the requested content is unavailable from the storage mechanism and the local storage cache unit.”

Tremblay et al. discloses, "further comprises a filler storage unit for storing filler content, and wherein the read director directs the read request to the filler storage unit to provide filler content when the requested content is unavailable from the storage mechanism and the local storage cache unit" as **["The store pair transaction generated from the received store pair instruction includes (1) a write command to write data in main memory; (2) one beat of data to be written in main memory and three beats of unused or filler data; (3) byte enable information specifying which bytes of the one beat of data is to be actually written in memory"** (Paragraph 0027)]

Chiou et al and Tremblay et al. are analogous art because they are all from the same field of endeavor of accessing memory and storage.

At the time of the invention it would have been obvious to a person of ordinary skill in the art to modify the system of Chiou et al to include the use of filler data to fill in data where data is not available as disclosed by Tramblay et al. Chiou et al. discloses the availability of a second level of cache in the client computer. In combination with the filler data disclosed by Tramblay et al., they disclose the invention claimed. The motivation to combine these arts is found in Tramblay et al. as "Cache memory is configured to transfer data to and from memory controller in bursts and provide access to stored data to load/store unit. In a preferred embodiment, cache memory 130 organizes and stores data according to cache lines. In one embodiment, a cache line comprises four 8-byte words or beats." (Paragraph 0028) As data is provided in bursts, filler data must be used to cover where data is unavailable.

Therefore it would have been obvious to combine the teachings of Chiou et al. with Tremblay et al. to obtain the inventions claimed in **Claim 3 & 13**.

As per Claim 14, Chiou et al and Tremblay et al. further disclose, "comprising the step of writing content from the storage mechanism to" as [**"If a cache hit does not occur (e.g., the requested data is not located in the SSC cache), then the line card reads the requested data from the target disk and sends the data back to the requestor in step 94. In step 96, the line card may forward the requested data along with the original request to the cache manager responsible for the target device. In step 98, the cache manager may check for available space in the SSC cache to see if, to store the current requested data"** (Col 13, Line 18)].

CLOSING COMMENTS

Conclusion

STATUS OF CLAIMS IN THE APPLICATION

13. The following is a summary of the treatment and status of all claims in the application as recommended by **M.P.E.P. 707.07(i)**:

CLAIMS REJECTED IN THE APPLICATION

14. Per the instant office action, **Claims 1-16** have received a first action on the merits and are subject of a first action non-final.

15. The examiner requests, in response to this Office action, support be shown for language added to any original claims on amendment and any new claims. That is, indicate support for newly added claim language by specifically pointing to page(s) and line no(s) in the specification and/or drawing figure(s). This will assist the examiner in prosecuting the application.

16. When responding to this office action, Applicant is advised to clearly point out the patentable novelty which he or she thinks the claims present, in view of the state of the art disclosed by the references cited or the objections made. He or she must also show how the amendments avoid such references or objections See 37 CFR 1.111(c).

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kenneth M. Lo whose telephone number is 571-272-9774. The examiner can normally be reached on Mon - Fri (7:30am - 5:00pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hyung Sub (Sam) Sough can be reached on 571-272-6799. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

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03/21/07

Kenneth Lo
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HYUNG SOUGH
SUPERVISORY PATENT EXAMINER

3-26-07